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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,271

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Masahiro Tada

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EXAMINER

TSAL, H JEY

ART UNIT

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2895

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/551,271	Applicant(s) TADA ET AL.	
	Examiner H.Jey Tsai	Art Unit 2895	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Objections

Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. A film-formation treatment by sputtering does not further limit the subject matter.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funk et al. 6,448,604, newly cite, in view of Brunner 2005/0221528 and Wolf, vol. 1, pages 331-332, previously applied.

Funk et al. discloses a method for manufacturing a micromachine including an oscillator, comprising:

a step of forming a sacrifice layer 14 around a movable portion of the oscillator (MEMS frequency variable capacitor); col. 1, lines 3-67, figs. 1-6,

Art Unit: 2895

the sacrifice layer 14 comprising silicon oxide, col. 3, lines 3-67,
a step of covering the sacrifice layer with an overcoat film 15/16,
followed by the formation of a penetrating hole 20 reaching the sacrifice layer 14
in the overcoat layer 15/16;

a step of performing sacrifice-layer etching which removes the sacrifice layer 14
using the penetrating hole 20 in order to form a space around the movable portion 15;
and a step of performing a film-formation treatment by sputtering at a reduced pressure
(vacuum and sputtering) following the sacrifice-layer etching so as to form a sputtering
layer 24 (aluminum) that seals the penetrating hole and is formed in to a wiring,
col. 4, lines 40-67, fig. 6, wherein the sputtering layer 24 is composed of one selected
from the group of an aluminum copper film And an aluminum silicon film.

Brunner discloses a method for manufacturing a micromachine including an
oscillator, comprising:

a step of forming a sacrifice layer 209, 205 around a movable portion of the
oscillator 206; para. 26, 37-49, figs 3a-3f,

the sacrifice layer 209, 205 comprising silicon oxide, para. 40, 38,
a step of covering the sacrifice layer with an overcoat film 211,
followed by the formation of a penetrating hole 213 reaching the sacrifice layer
209, 205 in the overcoat layer 211;

a step of performing sacrifice-layer etching for removing the sacrifice layer 209,
205 using the penetrating hole 213 in order to form a space around the movable portion
206; and a step of performing a film-formation treatment at a reduced pressure

Art Unit: 2895

(vacuum and sputtering) following the sacrifice-layer etching so as to form a wiring layer that seals the penetrating hole, para.46.

regarding claim 2, wherein the method is applied to a micromachine having means for driving oscillation in the oscillator, para. 26, 46 of Brunner.

regarding claim 5, wherein the film-formation treatment at a reduced pressure is a film-formation treatment by sputtering, para. 46, 56, 60 of Brunner.

The difference between the references applied above and the instant claim(s) is: Funk et al. teaches sealing penetrating hole with aluminum but does not teach using sputtering deposition and using aluminum copper or aluminum silicon material.. However, Bruner teaches at para. 46, 40 , 38, 60, using sputtering aluminum for film-formation treatment to seal the penetration hole and doped silicon oxide for sacrificial layer 209 and 205. Bruner also teaches at para. 10, preferably the silicon oxide is silicon dioxide; when silicon oxide is referred to in this document, silicon dioxide is the most preferred embodiment, although conventional, doped and/or non-stoichiometric silicon oxides are also contemplated. Wolf teaches at vol. 1, pages 331-332, aluminum alloy including Al-Cu and Al-Si are more frequently used than pure aluminum in microelectronic application because they possess enhanced properties for interconnect requirement.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above Brunner's teachings' process by using sputtering deposition for metal deposition and using frequently used aluminum alloy including aluminum copper or aluminum silicon for metal film formation as taught by

Art Unit: 2895

Funk et al. and Wolf et al. because both aluminum copper and aluminum silicon possess enhanced properties for interconnect requirement in microelectronic application so that all metal layers in the microelectronic mechanical device would have enhanced aluminum property.

Claims 3-4 are rejected under 35 U.S.C 103 as being unpatentable over Funk in view of Brunner and Wolf as applied to claims 1-2 and 5 above, and further in view of Zurn 6,621,134, newly cited, and Schmid 6,761,068, previously cited.

The difference between the references applied above and the instant claim(s) is: Funk et al. in view of Brunner and Wolf et al. teaches forming a MEMS device having an oscillator but does not teach the means for driving the oscillation. However, Zurn teaches at figs. 4A-4B, 10, 11, 14, 15, 19, an electrostatic capacitive MEMS structure for driving a resonator (oscillator) and sealing penetration hole 144 with metal. Schmid teaches at col. 4, lines 1-12, means for driving oscillation are static electric or piezoelectric.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings by using static electric or piezoelectric for driving oscillation as taught by Zurn and Schmid because static electric and piezoelectric would cause the movable portion of the device to oscillate so that an oscillation is formed.

Conclusions

Art Unit: 2895

Applicant's arguments filed March 16, 2009 have been fully considered but they are not persuasive. Because newly cited reference Funk et al. teaches forming a wiring layer having one end of wire that seals the penetration hole, and the other end of wire with a contact pad as set forth above. And, sputtering deposition is inherently under reduced pressure in the art. Brunner teaches forming sealing metal layer with sputtering deposition under vacuum as set forth above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Richards can be reached on (571) 272-1736.

The fax phone number for this Group is 571-273-8300.

/H.Jey Tsai/

Primary Examiner, Art Unit 2895

6/23/2009